

FILE 8857

# **IPSWICH RIVER MASSACHUSETTS**

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## **SURVEY (REVIEW OF REPORTS)**



**DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASS.**

**MAY 1966**

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## SYLLABUS

The Division Engineer finds that the existing navigational facilities at Ipswich River, Massachusetts are inadequate for the commercial fishing and recreational fleets, both existing and prospective. He finds also that sufficient benefits would be realized by the fleets to warrant Federal participation in further improvement. He recommends, therefore, that the existing project for the river be modified, and considers the proper modification to consist of:

a. A channel 6 feet deep and 60 feet wide, with additional widths at the bends, and through the jetties, extending from the 6-foot depth contour in Plum Island Sound to a line about 400 feet downstream of Nabbys Point.

b. An anchorage 5.5 acres in area, and 6 feet deep located at the upper end of the project with a second anchorage 7 acres in area to be located in Neck Cove adjacent to the 6-foot channel.

c. Two training jetties, one on either side of the river entrance, and each with its centerline 130 feet distant from the center line of the 100-foot wide channel between them. The total estimated construction cost of the project is \$1,330,000, exclusive of \$27,000 costs of additional aids to navigation.

The project is recommended subject to the requirements that local interests contribute in cash 21 percent of the construction cost, presently estimated at \$279,000. The net cost to the United States is \$1,051,000 for construction, \$27,000 for additional navigation aids, with \$19,200 for additional annual maintenance for project modification and \$1400 additional maintenance for navigation aids. The benefit-cost ratio is 2.0.

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U. S. ARMY ENGINEER DIVISION, NEW ENGLAND  
CORPS OF ENGINEERS  
424 TRAPELO ROAD  
WALTHAM, MASS. 02154

ADDRESS REPLY TO:  
DIVISION ENGINEER

REFER TO FILE NO. NEDED-R

17 May 1966

SUBJECT: Survey (Review of Reports) on Ipswich River, Massachusetts

TO: Chief of Engineers  
ATTN: ENGCW-PD

AUTHORITY

1. This report is submitted in compliance with a resolution, adopted 17 August 1959, by the Committee on Public Works of the House of Representatives, United States. The resolution reads as follows:

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE HOUSE OF REPRESENTATIVES, UNITED STATES, That the Board of Engineers for Rivers and Harbors, be, and is hereby, requested to review the reports on the Ipswich River and Plum Island Sound, Massachusetts, submitted in Senate Executive Document Numbered 74, 48th Congress, First Session, and other pertinent reports, with a view to determining whether the existing project should be modified in any way at this time."

2. By letter dated 31 August 1959, the Chief of Engineers assigned a survey report to the Division Engineer, New England Division.

PURPOSE AND EXTENT OF STUDY

3. This study has been made to determine the economic justification of modifying the existing Federal navigation project in Ipswich River in accordance with the needs and desires of local interests.

For preparation of a plan of improvement, it was necessary to determine the status of existing navigation conditions. For this purpose, detailed hydrographic surveys were necessary. The surveys included soundings and probings to determine the amount of character of materials involved. In addition to field surveys, available maps, charts, aerial photographs, commercial statistics, and other related data have been studied. A public hearing was held at Ipswich, Massachusetts on 9 May 1962. The information obtained is described later in this report under Improvements Desired. This information has been supplemented further by subsequent contacts with local interests. All aspects of desired navigational improvements have been considered in this study.

#### DESCRIPTION OF NAVIGATIONAL CONDITIONS

4. The Ipswich River rises about 2 miles west of Wilmington in northeastern Massachusetts. It flows easterly for about 13 miles, then northerly for 5 miles then swings easterly for 13 miles to a swamp at Wenham. From the swamp, it flows generally in a north-easterly direction to Plum Island Sound. The mouth of the river is 9 miles south of Newburyport, Massachusetts, and 9 miles west of Cape Ann. Between Wenham Swamp and its mouth, the river has a drainage area of about 97 square miles.

5. Navigation of the waterway is obtainable from Ipswich Bay, through the relatively deep waters of Plum Island Sound to the mouth of the river at Little Neck. This portion of the waterway is about 2 miles long. Depths range from 7 to 26 feet, with the greater part of it between 10 and 20 feet. From the mouth, the river meanders through salt marshland for about 3 miles to the head of navigation near the business section of Ipswich. Controlling depths (1963) in the river are 0.6 feet across the bar at the entrance and 0.3 feet in the vicinity of the Town Wharf.

6. All depths in this report refer to the plane of mean low water as established by the Coast and Geodetic Survey for this locality. The mean range of tide is 8.6 feet at the river entrance. The spring range is 9.9 feet. The locality is shown on U. S. Coast and Geodetic Survey Charts Nos. 1206 and 213, on U. S. Army Map Service Quadrangle Sheet titled "Ipswich, Massachusetts" and on the map accompanying this report.

## TRIBUTARY AREA

7. The immediate tributary area lies in the town of Ipswich, Essex County, Massachusetts. The town is about 28 miles north of Boston, Massachusetts, and contains a land area of about 33 square miles. In 1960, its permanent population was 8,544. In addition, there is a substantial summer population, centered chiefly near the mouth of the river at Great Neck. The economy of the town is aided greatly by the existence of this summer colony. The 1962 real estate valuation of the town was \$13,766,000.

8. Manufacturing is the most important industry. In 1963, 14 firms employing 1,016 persons, produced varied items which included electric lighting fixtures and equipment, tools, dyes, and milled woodwork. Another significant industry is a wholesale fish company which buys, processes, and distributes clams, shrimps, and scallops to retail outlets. There are 4 fish dealers in the town selling principally at retail.

9. The locality is served by the Boston and Maine Railroad and two bus companies, which operate over a network of primary and secondary roads.

## BRIDGES

10. There are no bridges in the area studied in this report.

## PRIOR REPORTS

11. This waterway has been subject to several reports since 1875. The essential features of the reports are listed below.

<u>Date of Report</u>	<u>Type</u>	<u>Work Considered and Recommendation</u>	<u>Published In</u>
6 Dec 1875	Survey	Dredging channel through Sand Bars in River. Recommended	House Ex. Doc. 77, 44th Cong., 1st Sess.
5 Nov 1883	Prelim. Exam Survey	Channel Improvements. Not Recommended	Sen. Ex. Doc. 74, 48th Cong., 1st Sess.

<u>Date of Report</u>	<u>Type</u>	<u>Work Considered and Recommendation</u>	<u>Published In</u>
22 May 1905	Prelim. Exam.	Channel Improvements. Not Recommended	House Doc. 142, 59th Cong., 1st Sess.
12 May 1926	Prelim. Exam.	Channel Improvement. Not Recommended	House Doc. 467, 69th Cong., 1st Sess.
17 Mar 1939	Prelim. Exam. & Survey	Exam. favorable to further study. Not Recommended in Survey Report	Not published.
16 Dec 1946	Prelim. Exam.	Further study of Fox Creek and Plum Island Sound. Not Recommended.	Not published.

#### EXISTING CORPS OF ENGINEERS' PROJECT

12. The existing project is the only one ever authorized for this waterway. It was adopted on 5 August 1886, and provides for a channel 60 feet wide, 4,000 feet long and 4 feet deep, through 2 sand bars in the river known as "The Shoals" and "Labor in Vain". These bars extend to the "Deep Hole". The project was completed in 1894 and has not been maintained by the Federal government. However, the Commonwealth of Massachusetts had dredged it at various times. The costs for new work were \$5,617.91. Maintenance funds expended for field surveys were \$2,161.40.

#### OTHER IMPROVEMENTS

13. Between 1906 and 1938, the Commonwealth of Massachusetts expended \$81,000, including a contribution of \$8,800 by the town, to provide a 6-foot deep channel from the 6-foot depth contour in Plum Island Sound to a line about 400 feet below Nabbys Point. From this line a 4-foot channel was dredged to the vicinity of the Town Wharf. The channel width was 60 feet, except at the entrance where a 100-foot width was provided. Prior to this work, the Commonwealth had constructed a jetty at the entrance. Construction costs are unavailable.

## LOCAL COOPERATION ON EXISTING & PRIOR PROJECTS

14. No specific items of local cooperation were required for the existing Federal project,

## TERMINAL AND TRANSFER FACILITIES

15. At the upper end of the river there are four solid-fill marginal wharves in good condition. One is owned by the Town and open to the public. It has a small crane and an attached float which extends to the channel and is used by both recreational and fishing boats. Of the three privately-owned wharves, one is not in use, and the other two are used principally by fishing boats. On the reach of the river from Nabbys Pond to the mouth, eight piers of the ramp and float-type are used by recreational craft. Two of these floats are open to the public, the other six are privately-owned.

## IMPROVEMENTS DESIRED

16. In order to determine the nature and extent of navigation improvements desired by local interests, a public hearing was held in Ipswich, Massachusetts on 9 May 1962. Attendance included representatives of State and local governments, boatyard owners, yacht club interests and local residents.

17. A detailed plan of improvement was submitted by the Ipswich Waterways Development Committee. Details of the proposed improvement included:

a. Jetty and groin construction at the mouth to maintain a navigable entrance.

b. General channel straightening to provide for a more rapid river flow.

c. Provision of anchorage in the vicinity of Neck Creek or Neck Cove, and

d. Deepening of the river from the mouth to the head of the State channel.

18. As justification for improvement, local interests cited difficulties experienced in navigation of the waterway. The difficulties were attributed to inadequate widths and depths, particularly at low



tidal stages. At such times, navigation of the entrance channel is said to be impossible for all craft. In addition, the restricted widths in the upriver channels were claimed to be a source of navigational difficulty for passing boats. The groins and jetties at the mouth were requested for the purpose of reducing shoaling at that location and assuring adequate channel depths at all tidal stages.

19. Anchorage in the river itself is limited. Boats anchor either in the channel or in the tributary creeks. In the creeks they go aground at low water. In the lower river, the existing recreational fleet is forced to anchor chiefly in Plum Island Sound. Anchorage in this location is claimed to be hazardous as the area is exposed to storms from northeast and easterly quadrants. Provision of anchorage in Neck Creek would eliminate this hazard to boats.

20. At the present time, a large portion of the boats using the upper part of the waterways are transient. These transient boats consist in great part of trailer-carried outboard motor boats which are put overboard at Ipswich and landed later in the day. Proponents of improvement stated that provision of the requested navigational facilities would attract more and larger transient boats to the area plus providing for expansion of the fishing fleet which has declined in size because of inadequate navigational facilities.

21. Should anchorage in Neck Creek be found economically unsound, a suggestion was offered to the effect that investigation be made of the possibility of providing anchorage in the vicinity of Eagle Neck. It was also suggested that should overall improvement be uneconomical, that maintenance of the existing project be accomplished.

#### EXISTING AND PROSPECTIVE COMMERCE

22. Fish is an important item of commerce on the waterway. Prior to World War II, according to local interests, 40 commercial fishing boats were based on the river. This fleet has now dwindled to 10 boats. The gradual loss of adequate navigation facilities is claimed to be the reason for the decline in the fishing fleet. Shell-fishing was also a major item in commerce. This activity has also declined because of pollution. Town of Ipswich interests claim that dumping of industrial wastes and sewage in the upper river has polluted the waterway to the extent, that the State Public Health Authorities have declared the river a contaminated area, and the

digging of clams has been prohibited. However, clams are still taken from the tributary bays and streams. The claim was made that channel restoration would tend to flush impurities from the river course, thus making the river fit for future clam fishing.

### VESSEL TRAFFIC

23. There are no detailed statistics available on vessel trips in the waterway. However, on the basis of the locally based fleet of 493 recreational boats, plus the transient boats that visit the local beaches and fishing areas, it is reasonable to assume that over 30,000 vessel trips are made annually. A large part of the vessel traffic is in the lower reaches of the river.

### DIFFICULTIES ATTENDING NAVIGATION

24. The chief navigation difficulty in the waterway results from inadequate depths at low tidal periods. At the river entrance a sand bar forms periodically and limits navigation to half-tide periods.

### WATER POWER AND OTHER SPECIAL SUBJECTS

25. The waterway is tidal. Flood control, water power and other related subjects are not pertinent to this report.

26. The U. S. Fish and Wildlife Service has been consulted on the effects of the improvement. In its report, the Service indicated the existence of extensive soft shell clam and quahog resources in the project area. In Plum Island Sound, beyond the river mouth, sea clam beds are a source of recreational fishing. Dredging in the area within existing channel limits would result in no damage to fish and wildlife resources. The detailed Fish and Wildlife report is contained in Appendix B.

### PROJECT FORMULATION

27. Primary examination of overall navigational improvement revealed that maximum benefits could be obtained by deepening the entire waterway to the vicinity of the Town wharf. It was found that the upper 1000 feet of such a channel would involve removal of a considerable amount of ledge. It was found also that insufficient room in the upper area was available for anchorage space that could be provided economically. In view of these aspects, the locality below the ledge area was investigated. It was found that the

6-foot channel could be terminated at a line 400 feet below Nabbys Point with a suitable anchorage adjacent to it. As this plan would generate almost the same total of benefits with a larger B/C ratio, it was selected the most economically feasible plan. It was further considered that no ancillary benefits, such as those pertaining to pollution control, water power or wildlife, etc., would be involved.

#### PLAN OF IMPROVEMENT

28. Selection of a plan of improvement entailed consideration of the specific desires of local interests, together with provision of the most feasible plan that would adequately satisfy the needs of present and prospective boating throughout the entire waterway. The chief desire was adequate channel depths. Investigation of this aspect of navigation found that the river had shoaled to a considerable degree for a large portion of its length. This shoaling has occurred both in the State 6-foot channel and in the existing 4-foot Federal project area. The entire 6-foot channel was last maintained by the State in 1938. In 1956, the State maintained the 6-foot channel from Neck Cove through the entrance.

29. Examination of both existing and prospective boating indicates that restoration of the 6-foot channel depth would suffice for navigation. It was also found advisable to terminate the channel at the upstream limit of the State channel. The State terminated its 6-foot channel 400 feet downstream of Nabbys Point as hard material and ledge rock was encountered above that line.

30. In addition to channel deepening, local interests requested anchorage areas. Suggested areas were in the upper river near the Town wharf and other nearby wharves, and near the mouth. Examination of the upper area revealed that limited space was available for expansion of anchorage. However, it was found that sufficient space was available in the vicinity of Nabby's Point for about 100 boats. Such an allowance is predicated on the use of fore and aft moorings. This area was considered for improvement. Anchorage space is also limited in the lower portion of the river. Local interests requested that anchorage in Neck Creek be provided also. It was found that the greater portion of this area was 2 to 4 feet above mean low water which would make the cost per acre of anchorage unreasonably high. Sufficient area for a 7-acre anchorage is available in Neck Cove at a small unit cost per acre. Therefore, the plan of improvement includes anchorage in this

area for about 120 boats moored fore and aft. Such anchorage will not completely allow for all the boats to be added to the fleet, but will accommodate the permanently moored boats. The greater part of the outboard fleet will continue the present practice of launching for a day's sail and hauling ashore afterwards.

31. Navigation of the entrance is hampered at low tidal periods by a shallow sand bar extending across the river mouth. Formation of the bar is due in large part, to the presence of a jetty projecting in a northeasterly direction from the southerly side of the entrance. It was constructed prior to 1938 by the Commonwealth of Massachusetts. The structure, originally designed for protection of boats navigating the entrance, has also served to impound a considerable amount of the predominantly northerly littoral drift. The excess drift now rounds the end of the jetty and is deposited in the river entrance. To obviate this deposition of materials and provide for scouring of the channel, the plan of improvement includes 2 training jetties at the mouth of the river. Each jetty would be constructed parallel to, and 80 feet distant from the channel limits, thus providing a 260-foot wide opening in the entrance. Design height of the jetties is 10.0 or 1.4 feet above mean high tide. The jetties would be of core-filled run of quarry stone protected with armor stone.

32. The plan selected, which benefits both the upper and lower parts of the waterway, consists of:

a. A channel 6 feet deep and 60 feet wide, with extra widening at the bends, and a width of 100 feet at the entrance. The channel would extend from the 6-foot depth contour in Plum Island Sound to a line 400 feet downstream of Nabbys Point, a distance of about 2.5 miles.

b. A 5.5-acre anchorage 6 feet deep, adjacent to the upstream end of the 6-foot channel.

c. A 7.1-acre anchorage, 6 feet deep in Neck Cove adjacent to the 6-foot channel.

d. A 1,200-foot long jetty to be located at the north side of the entrance, the jetty to have a top width of 6.5 feet at an elevation of 11.5 feet above mean low water, with side slopes of 1 vertical on 2 horizontal.

e. A 1,400-foot long jetty to be located at the south side of the entrance, the jetty to have a top width of 6.5 feet at an elevation of 11.5 feet above mean low water with side slopes of 1 vertical on 2 horizontal.

33. This plan will be adequate to serve the needs of existing and prospective boating on the waterway. It is anticipated that anchorage areas will be augmented by future marina type mooring facilities to be constructed by local interests as needed.

#### SHORELINE CHANGES

34. The proposed improvement is confined within the limits of the State-dredged channel, and will not disturb the present configuration of the river bank. The 2 jetties at the entrance will control currents and provide scouring action, thus tending to eliminate formation of a bar across the entrance. The predominant littoral drift is northward and caused by refracted waves from easterly and south-easterly storms. It is expected that littoral drift will continue and eventually fill the area southward of the jetty during project life. However, it is anticipated that the scouring action caused by the presence of the jetties will prevent shoaling of the channel by depositing the drifting materials in deeper offshore areas.

#### ESTIMATES OF FIRST COST

35. Estimates of first costs of all considered plans of improvement have been made. Costs reflect April 1966 levels for comparable harbors. Channel and anchorage depths were estimated to be 6 feet with a 1-foot allowance for overdepth. Side slopes of 1 vertical on 3 horizontal were used on channels and anchorages.

#### Project Construction Cost

(Selected Plan of Improvement)

#### Corps of Engineers

Channel Dredging	\$ 238,000
Anchorage	213,000
Jetties	576,000
	<u>\$1,027,000</u>

Project Construction Cost (Cont'd)

Brought Forward	\$1,027,000
Contingencies	153,000
	<u>\$1,180,000</u>
Engineering & Design	55,000
Supervision & Administration	95,000
	<u>\$1,330,000</u>
 <u>U. S. Coast Guard</u>	
Additional Navigation Aids	<u>27,000</u>
 Total Project Cost	 \$1,357,000*

\*Exclusive of \$16,000 study costs.

REQUIRED AIDS TO NAVIGATION

36. The United States Coast Guard has been consulted and has advised that a total of 20 navigation aids will be required in the event of improvement. The aids would consist of 18 unlighted buoys and 2 fixed lights. Total first cost is estimated at \$27,000, with annual maintenance of \$1,400.

ESTIMATES OF BENEFITS

37. Benefits to be realized by improvement of the waterway will accrue to both the existing and prospective fleets. The existing recreational fleet will benefit from increased use and from provision of additional area to allow for expansion. The expansion will consist of boats being added immediately after improvement and added periodically after improvement in a normal growth pattern. Benefits will also be realized from expansion of the existing fishing fleet.

38. The existing commercial fishing fleet consists of 10 boats 7 of which are engaged chiefly in lobstering and 3 in general fishing. According to local interests, the local fishing fleet, exclusive of lobster boats, formerly numbered 40 boats. The decline of the fleet to its present number is attributed to the lack of adequate navigational facilities. Should navigation improvement be effected, local interests

claim that the fleet would revert to its former size in a very short time. This claim is considered optimistic, as most of the boats have been retired, sold or transferred to other harbors. However, it is reasonable to assume that the same opportunities for profitable fishing exist in the locality and that as in the past, the fishing grounds would yield a large enough catch to support a 40-boat fleet. Therefore, it is believed that navigational improvement will restore the fleet to at least its former size during project life. On this basis, it is considered that 37 more boats would be added during project life. Of the 37 boats to be added, it is considered that 17 would be locally-owned boats which have transferred to other harbors and would return for personal considerations only and the remaining 20 would be new boats. It is not expected that further expansion of the fleet will occur as there is insufficient room to accommodate them. No indication of expansion of the lobster fleet is discernible at this time.

39. One species of fish caught abundantly in this locality is herring. The season for this type of fishing begins about September and ends in December, for an average season of about 120 days. With allowances made for inclement weather, necessary repairs, holidays, etc., about 90 days of fishing are available. The average catch per day is 3 tons for this type of fishing. Thus each boat can average 270 tons per season. The average ex-vessel price of this species of fish is \$8.00 per 304 lb. barrel or \$52.56 per ton. For the 270-ton seasonal catch, the gross value to the boat is  $270 \times \$56.25$ , or \$15,188. It has been found that 60 percent of the gross value is attributable to costs incurred in catching the fish. The costs consists of such factors as crew wages, operating costs, maintenance, fuel, etc.. The net value per boat is  $\$15,188 \times 0.40$  or \$6,075, a general benefit. The boats engage in ground-fishing during the rest of the season and average about 110 days of fishing at 6 tons per fishing day. The fish taken are used for animal feed, industrial and agricultural purposes, and are valued at \$20.00 per ton. This value is based on weighted ex-vessel price of fish at Gloucester, as reported by the Bureau of Commercial Fisheries, Department of the Interior. Thus, the gross value of the fish for this part of the season would amount to \$120 daily, or \$13,200 for the season. The net would be  $0.40 \times \$13,200$  or \$5,280. This value, added to the net value of \$6,075 for the herring catch amounts to a net return of \$11,355 per boat annually, a general benefit. The 20 new boats to be added during project life would generate benefits of

20 x \$11,355 or \$227,100. Since the boats would be added gradually during project life, this sum would require reduction to its average annual equivalent. At a 3.125 percent interest rate in a straight line appreciation, this would amount to  $\$227,100 \times 0.3866$  or \$87,000 annual benefits. No benefit for lobster boats were evaluated. These boats are the one-man, shallow-draft type of boat. While they do not have access to the harbor at all times, they can usually schedule their days fishing to enter or leave the harbor at favorable tides and still complete a full day's fishing. No additional lobster boats would be added to the fleet because the waterway is not strategically located with respect to the more prolific grounds for this type of fishing.

40. Benefits for both the existing and prospective recreational fleets have been estimated. The benefits have been evaluated as the gain in annual for-hire return, which boat owners would enjoy, should improvement be made. Ideal return is expressed as a percentage of the current, or average depreciated value, of the boats comprising the fleets. It reflects ideal navigational conditions for the harbor and varies with the sizes and types of boats. In this report, ideal return ranges from 15 percent for charter boats to 9 percent for the larger boats. Present return is based on the navigational use which can be made in the unimproved harbor. Future return represents the use which can be made in the improved harbor. Both returns are expressed as percentage factors of the ideal return. The difference between the two represents the gain in use and is applied to the ideal return, in order to arrive at the gain in return resulting from improvement.

41. As noted previously, the waterways is incapable of navigation at low tidal stages. The smaller outboard motor boats drawing 2 to 3 feet are limited to those periods in which tides of 3 or more feet prevail. Consequently, full use of the harbor is denied to the entire existing fleet, both for outboard motor boats as well as deeper draft boats. Improvement of the harbor by provision of a 6-foot channel would make it possible for the existing fleet to navigate at all times, thus allowing for increased unrestricted use. The percentage of increased use for the various classes of boats have been computed and are shown in Table I. The benefits, being recreational, have been classified as 50 percent general and 50 percent local in accord with accepted practice.

42. Local interests claim that the inadequacy of the waterway and lack of sufficient protected anchorage precludes expansion of



the existing recreational fleet. In the upper end of the river, the greater part of the anchorage is in the vicinity of the town wharf. Boats completely fill all available space, including the channel area. Other boats anchor outside the channel area, and go aground during low tidal periods. At the lower end of the river the deeper draft boats are forced to anchor in Plum Island Sound outside the river mouth. This location is hazardous in the event of northeasterly storms. In view of these conditions, it is reasonable to assume that boats will be added immediately after improvement. Based on local estimates plus comparison with similar harbor improvements in other localities, a total of 15 new boats would be added immediately after improvement. Benefits for these boats are shown in Table II

43. Provision of additional anchorage will allow for normal growth of the recreational fleet. The lack of safe adequate anchorage has presently arrested this growth. Improvement will make it possible for boats to be added periodically over project life in consonance with population growth and normal increases in recreational boating. On this basis, it is estimated, conservatively, that the fleet will increase by about 50 percent or 242 boats. Benefits for these boats are shown in Table III. The total benefits have been reduced to an annual average equivalent at 3.125 percent over project life.

44. At the present time, transient boating in the waterway is sporadic. Virtually, all transient boating is confined to trailer-drawn outboard motor craft. These boats are launched preferably in the morning and return in early evening. However, tidal conditions often reduce the length of trips by either delaying launchings or hastening returns. Should improvement be effected, these boats would enjoy full use of the waterway. The larger transient boats are normally forced to anchor in the more hazardous Plum Island Sound outside the harbor entrance. Consequently, these boats do not plan extensive stays at this harbor. Improvement would result in longer visits by these boats. Benefits for the transient fleet are shown in Table IV.

TABLE I. BENEFITS TO RECREATIONAL BOATING

HARBOR: IPSWICH, MASS.

## LOCAL FLEET

## 130-day Season

HARBOR: FISHWICH, MASS.												
Type of Craft	Length ( feet)	No. of Boats	Depreciated Value		Ideal	Percent Return		Gain	Value \$	On Cruise		
			Average \$	Total \$		% of Ideal Pres.	Ftr.			Avg. Days	% of Season	Value \$
<u>Recreational Fleet</u>												
Outboards	10-20	402	1,400	562,800	13	75	100	3.3	18,570			
Cruisers	15-30	80	4,000	320,000	9	65	100	3.2	10,240			
	31-50	8	10,000	80,000	9	65	100	3.2	2,560	20	15	384
	51-60											
<u>Charter Boats</u>												
Cruisers	21-35	3	3,000	9,000	15	70	100	3.0	270			
TOTALS		493							31,600			384

$$\$31,600 - 384 = \$31,216 \quad \text{Say } \$31,200$$

TABLE II. BENEFITS TO RECREATIONAL BOATING

HARBOR: IPSWICH, MASS			NEW BOATS ADDED IMMEDIATELY AFTER IMPROVEMENT									
Type of Craft	Length (feet)	No. of Boats	Depreciated Value		Percent Return			Gain	Value \$	On Cruise		
			Average	Total	Ideal	% of Ideal	Avg. Days			% of	Value \$	
			\$	\$		Pres.				Ftr.		Season
<u>Recreational Fleet</u>												
Outboards	10-20											
Inboards	15-30	10	5,000	50,000	9	0	100	9	4,500			
	31-50	5	10,000	50,000	9	0	100	9	4,500	20	15 675	
TOTALS		15		100,000					9,000		675	

$$\$9,000 - 675 = \$8,325 \quad \text{Say } \$8,300$$

TABLE III. BENEFITS TO RECREATIONAL BOATING

HARBOR: IPSWICH, MASS.

## NORMAL GROWTH

Type of Craft	Length (feet)	No. of Boats	Depreciated Value		Percent Return				On Cruise			
			Average	Total	Ideal	% of Ideal		Gain	Value \$	Avg. Days	% of Season	Value \$
			\$	\$		Pres.	Ftr.					
Recreational Fleet												
Outboards	10-20	200	1,330	266,000	13	-	100	13	34,580			
Cruisers	15-30	40	5,000	200,000	9	-	100	9	18,000			
	31-50	8	10,000	80,000	9	-	100	9	7,200	20	15	
TOTALS		248							\$59,780		1,080	

3.125% (50 Yrs.) - Ann. Av. Equiv.  
.3886

\$58,700  
- 1,080  
\$58,700 x 0.3866 = \$22,810  
Say \$22,800

TABLE IV. BENEFITS TO RECREATIONAL BOATING

HARBOR: IPSWICH, MASS.

## TRANSIENT FLEET (EQUIVALENT)

				Depreciated Value		Percent Return			On Cruise			
Type of Craft	Length (feet)	No. of Boats	Average \$	Total \$	Ideal	% of Ideal Pres.	% of Ideal Ftr.	Gain	Value \$	Avg. Days	% of Season	Value \$
Recreational Fleet												
Outboards	10-20	20	1,330	266,000	13	90	100	1.1	292			
Inboards	10-20											
Cruisers	15-30	2	4,000	8,000	11	85	100	1.7	136			
	31-50	4	10,000	40,000	9	80	100	1.8	720			

TOTALS

1,148 Say \$1,200

### SUMMARY OF BENEFITS

<u>Source</u>	<u>Local</u>	<u>General</u>	<u>Total</u>
20 New fishing boats (to be added) by final year of project life		\$ 87,800	87,800
Existing Recreational Fleet	15,600	15,600	31,200
New Boats Added (Recreational)	4,150	4,150	8,300
Normal Growth	11,400	11,400	22,800
Transient Fleet	<u>600</u>	<u>600</u>	<u>1,200</u>
Total	\$31,750 21%	\$119,550 79%	\$151,300

### ESTIMATE OF ANNUAL CHARGES

45. The estimated annual charges for the selected plan of improvement are based on anticipated project life of 50 years at interest rates of 3.125 percent for both Federal and local interests. Additional annual maintenance charges are based on maintenance charges experienced by the State and comparison with similar waterways in the locality. The charges are detailed as follows:

#### Federal Annual Charges

a. Corps of Engineers			
Interest (\$1,151,000 x 0.03125)	\$32,800		
Amortization (\$1,051,000 x 0.00854)	9,000		
Additional Annual Maintenance	<u>19,200</u>		
			\$61,000
b. United States Coast Guard			
Interest (\$27,000 x 0.03125)	\$ 850		
Amortization (\$27,000 x 0.00854)	250		
Annual Maintenance	<u>1,400</u>		
			<u>2,500</u>
Total Federal Charges			\$63,500

Brought Forward

Non-Federal Annual Charges

Cash Contribution \$279,000	\$	
Interest (\$279,000 x 0.03125)		8,700
Amortization (\$279,000 x 0.00854)		<u>2,400</u>
		\$11,100
Total Annual Charges		\$74,600

COMPARISON OF BENEFITS TO COST

46. Comparison of the estimated annual benefits of \$151,300 to the estimated annual carrying charges of \$74,600 results in a benefit-cost ratio of 2.0.

APPORTIONMENT OF COSTS AMONG INTERESTS

47. Construction costs for navigational facilities have been apportioned among interests in proportion to the benefits received. Since the ratio of evaluated general benefits to local benefits is 79 to 21 percent, construction costs have been apportioned in the same ratio. The apportionment of costs is shown as follows:

Federal

*Corps of Engineers (0.79 x \$1,330,000)	\$1,051,000
U. S. Coast Guard (Aids to Navigation)	<u>27,000</u>
	\$1,078,000

Non-Federal

Local cash contribution (0.21 x \$1,330,000)	<u>279,000</u>
Total Project Cost	\$1,357,000

\*Excluding study costs of \$16,000.

48. The estimated annual maintenance costs of \$19,200 for dredging and jetties and \$1400 for navigation aids are considered to be Federal costs to be incurred by the Corps of Engineers and the U. S. Coast Guard.

## PROPOSED LOCAL COOPERATION

49. Local interests should provide without cost to the United States, all lands, easements, and rights-of-way necessary for construction and maintenance of the project, when and as required. Local interests should also hold and save the United States free from damages that may result from project construction or maintenance.

50. There is at present a public landing, the Town wharf, located upstream of the proposed improvement. Since it would not be within the area of the proposed improvement, it would not serve as a required public landing for improvement. Therefore, as items of local cooperation, local interests, without cost to the United States, should provide a pier in the vicinity of each anchorage. The piers should be open to all on equal terms and provide access for boats to secure supplies and fuel. Local interests should also provide all necessary mooring facilities in the anchorage. The public landings estimated to cost \$14,000, each, would be self-liquidating through user charges. The benefits to be derived from improvement of the waterway are partly local and partly general in nature. Local benefits are estimated to be 31 percent of the total benefits. Local interests should share in project costs commensurate with the local benefits of 31 percent of the first cost of construction, exclusive of costs of aids to navigation. The local cash contribution is estimated to be \$277,000 (1967). Provision of, and maintenance of navigation aids are the responsibility of the Federal government.

## COORDINATION WITH OTHER AGENCIES

51. All Federal, State and local agencies, having an interest in the improvement of the waterway were notified of the public hearing held on 9 May 1962. Representatives of the Town of Ipswich, and the Commonwealth of Massachusetts, have since been consulted concerning the effects of the proposed improvement on their activities. The U. S. Fish and Wildlife Service, and comparable State agencies have been consulted. Their comments are contained in Appendix B of this report. Concurrence of the Federal Water Pollution Control Administration and the Public Health Service in the offshore dumping ground are contained in Appendix D.

## DISCUSSION

52. This river is one of the original waterways used in the United States by early Colonists in the foundation of their economy.



In former years, it was used chiefly by shallow draft fishing boats which fished along the New England coast. The combination of natural depths and tides sufficed for the boats. As the river shoaled, in part due to natural processes of sedimentation, but largely to the dumping of industrial wastes upstream, some of the fishing boats were either retired or sought other waterways. Tidal delays proved too costly, and fishing operations have declined considerably in recent years. Local interests claim this activity will increase, rather than continue to decline, should improvement be effected. The claim appears reasonable in view of the prolific fishing grounds in and offshore from Ipswich Bay.

53. Following the World War II period, recreational boating activity has increased at an ever-growing rate. Ipswich River has been subject to this trend to a point where the waterway is now saturated. Boating is presently hampered by navigation inadequacies and lack of anchorage. Without improvement, use of the waterway cannot increase and may even decline. With improvement, the inadequacies will be overcome permitting normal expansion of recreational boating in line with national and regional trends.

54. Past experience by the State shows the entrance channel shoals soon after dredging. The shoaling is caused by littoral drift which passes around the end of the State constructed breakwater. Construction of a jetty to deep water on the south side of the entrance will minimize the shoaling process, and reduce channel maintenance. Thus, any plan of improvement would include jetty construction.

### CONCLUSIONS

55. The Division Engineer finds navigation improvement of Ipswich River is both necessary and economically justified to meet the needs of the recreational and fishing fleets. He concludes that improvement can best be effected by providing a jetty on the south side of the mouth of the river, channel deepening to a line 400 feet downstream from Nabbys Point and provision of additional anchorage space both at the upper and lower ends of the waterway. The benefit-cost ratio is 1.8. The total first cost of construction is \$893,000 exclusive of navigation aids.

56. As the local benefits to be derived are 21 percent of the total benefits, local interests should share proportionately in the first cost of construction. The first cost of construction is estimated to total \$1,330,000. The cash contribution should be, therefore, 21 percent of \$1,330,000 or \$279,000.

### RECOMMENDATIONS

57. The Division Engineer recommends that the existing project be modified to provide for the following:

a. A channel 6 feet deep and 60 feet wide, with additional widths at the bends, and through the jetties, extending from the 6-foot depth contour in Plum Island Sound to a line about 400 feet downstream of Nabbys Point.

b. An anchorage 5.5 acres in area, and 6 feet deep located at the upper end of the project with a second anchorage 7 acres in area to be located in Neck Cove adjacent to the 6-foot channel.

c. Two training jetties, one on either side of the river entrance, and each with its centerline 130 feet distant from the center line of the 100-foot wide channel between them. The total estimated construction cost of the project is \$1,330,000, exclusive of \$27,000 costs of additional aids to navigation.

58. The modification is recommended subject to the requirements that local interests:

a. Make a cash contribution equal to 21 percent of the construction cost, currently estimated at \$279,000.

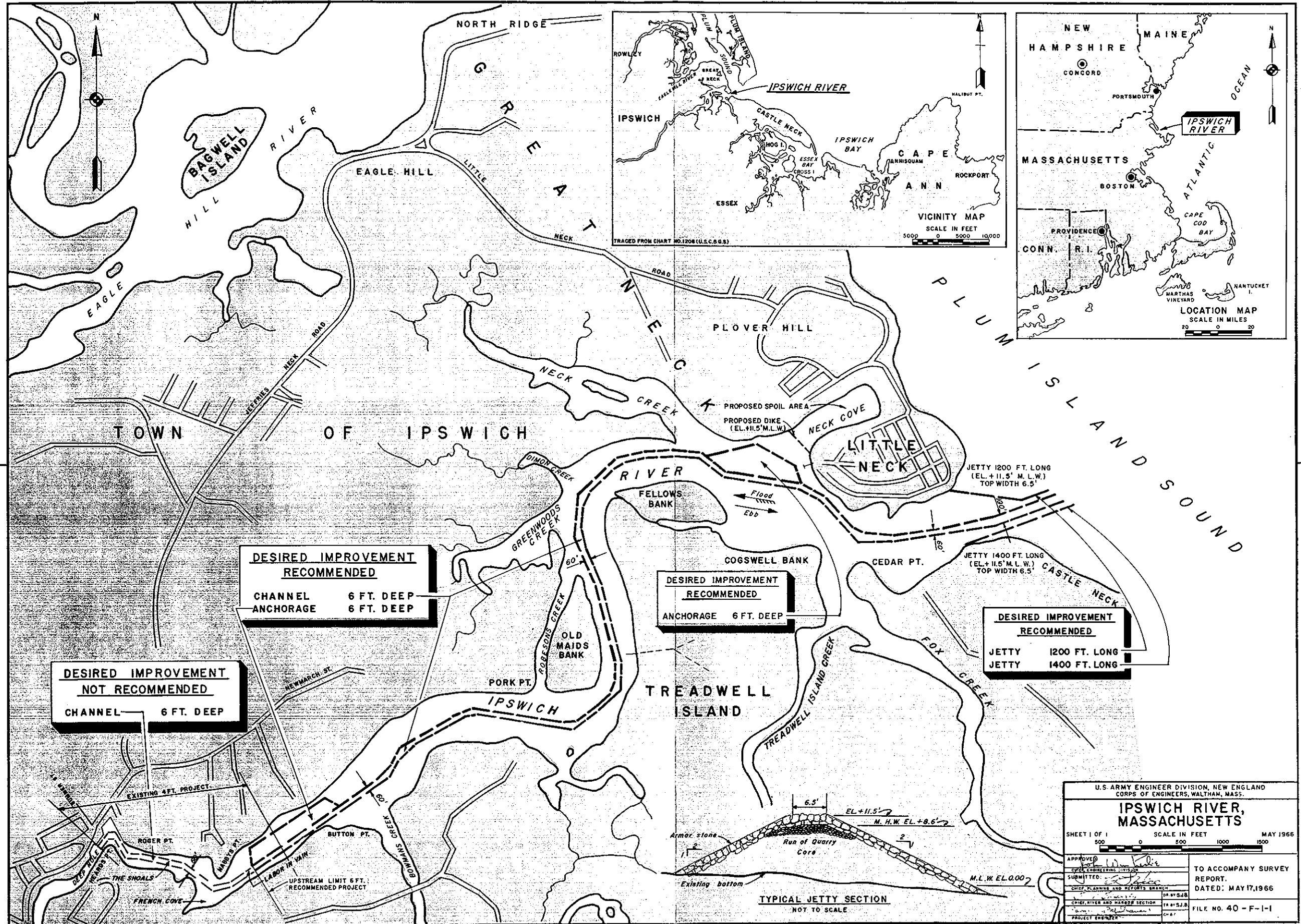
b. Construct 2 public landings, open to all on equal terms, and provide, without cost to the United States, all necessary mooring facilities in the anchorages.

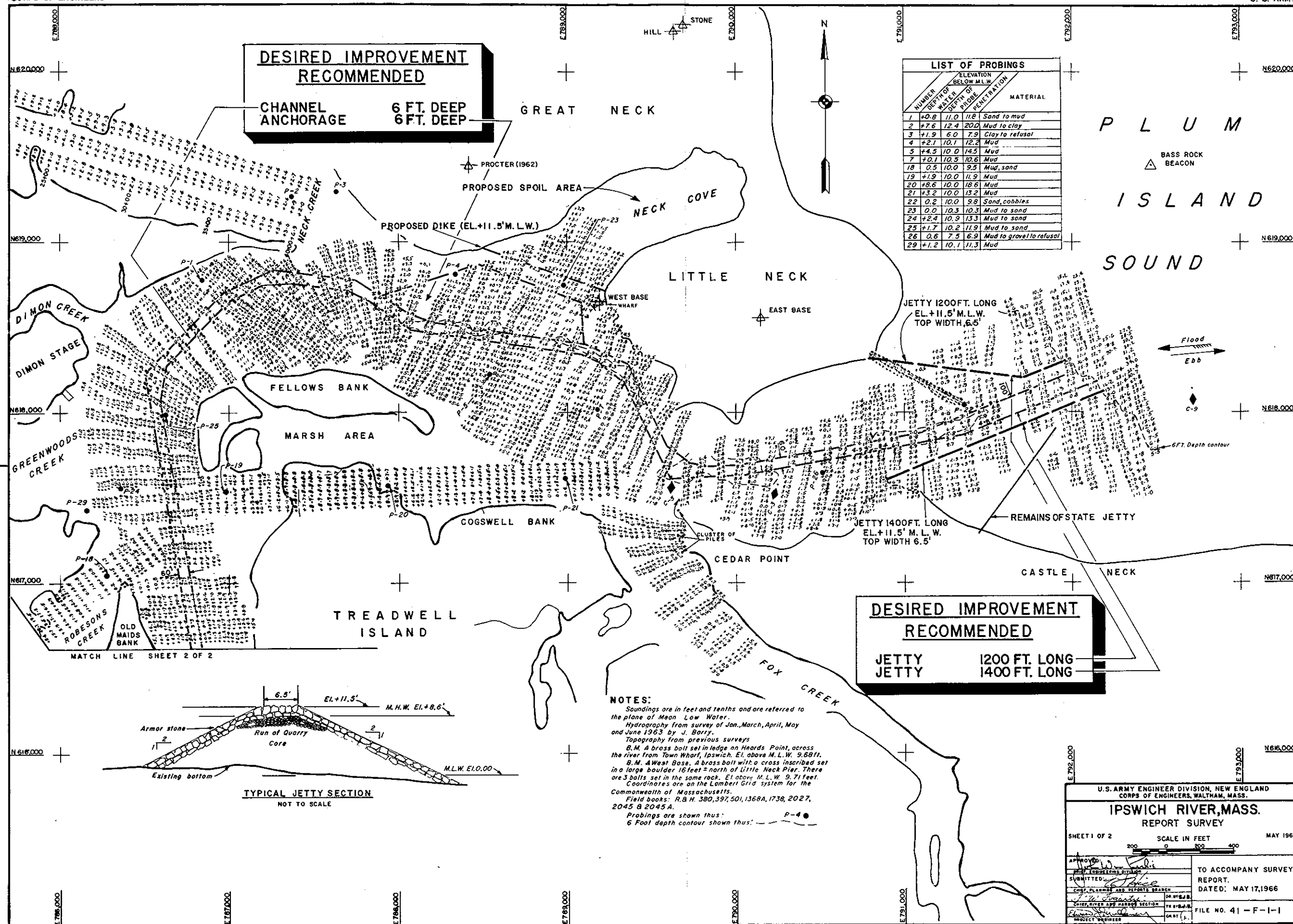
c. Provide, without cost to the United States, all lands, easements and rights-of-way necessary for construction and maintenance of the project.

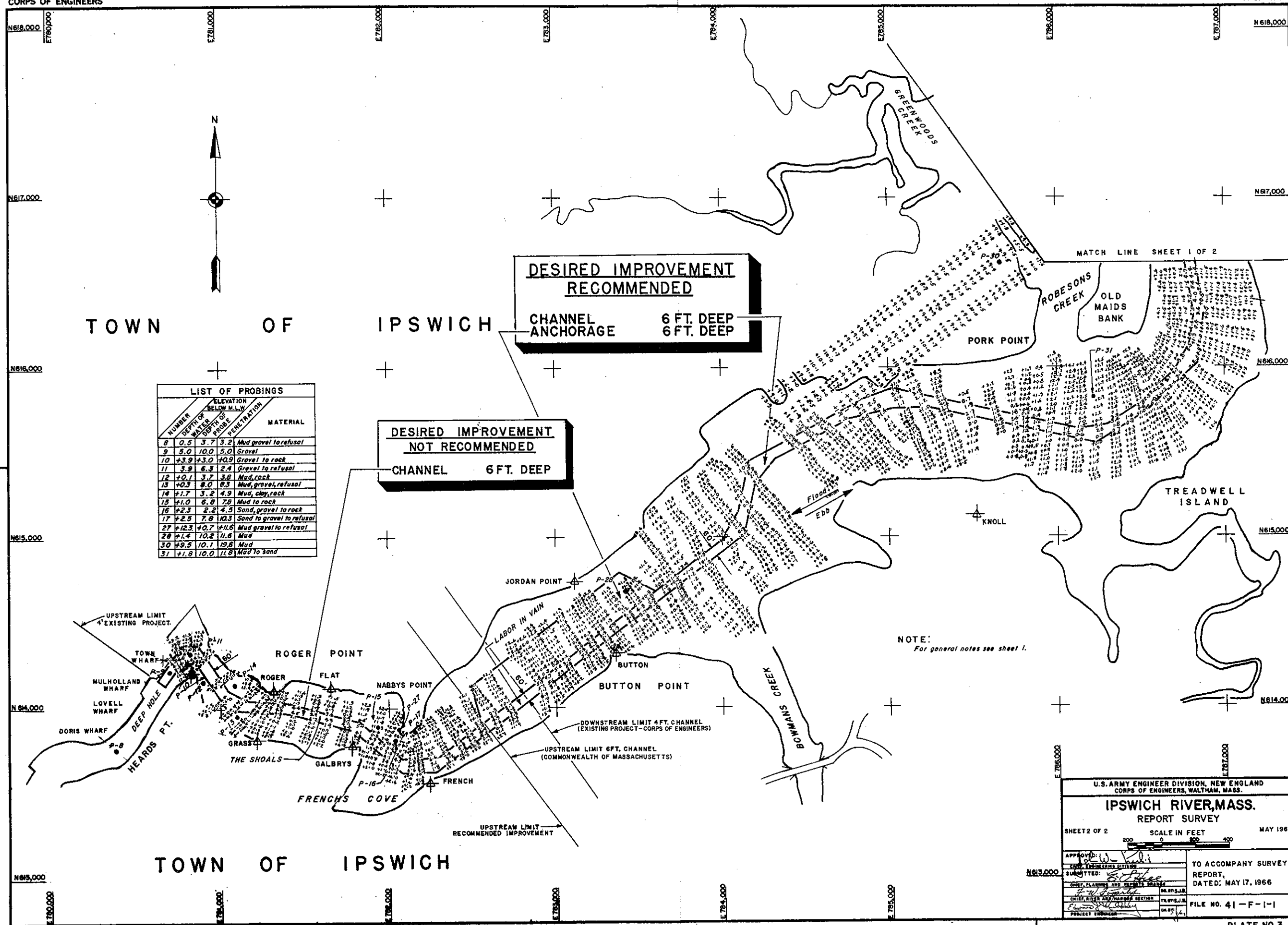
d. Hold and save the United States free from damages due to construction and subsequent maintenance of the project, and

e. Agree to furnish spoil disposal areas upon request of the Chief of Engineers if it is determined after detailed studies that such areas are necessary, and without cost to the United States, furnish any such areas required, including such dikes, bulkheads, and embankments, as may be necessary for the initial construction and maintenance of the project.

REMI O. RENIER  
Colonel, Corps of Engineers  
Acting Division Engineer







IPSWICH RIVER, MASSACHUSETTS  
APPENDIX A

ESTIMATES OF FIRST COST AND ANNUAL CHARGES

1. General. - This appendix includes estimates of first costs, both Federal and non-Federal, and annual charges for the improvement of Ipswich River as described in the section of the report titled "PLAN OF IMPROVEMENT". The plan includes dredging a channel, 6 feet deep and 60 feet wide, with extra width at the bends and in the entrance channel which is 100 feet wide. The channel would extend from the 6-foot contour in Plum Island Sound to a line 400 feet seaward of Nabbys Point for a distance of about 2.5 miles. The plan also includes 2 rubble-stone training jetties at the mouth, one on either side of the entrance and 260 feet apart, extending from shore to the 6-foot contour in Plum Island Sound.

2. Cost Estimates. - Details of first costs in this appendix include estimates of dredging costs, construction costs of jetties, contingencies, engineering, supervision and administration costs. Estimates of Federal annual charges include interest at 3.125 percent amortized for a 50-year project life, and estimates of additional annual maintenance. Local costs include a cash contribution toward the first cost of construction and costs of required public landings, which are considered self-liquidating. Non-Federal annual charges are also based on an interest rate of 3.125 percent.

3. Materials. - Prior experience by the Commonwealth of Massachusetts and probings by the Corps of Engineers indicates the presence of mud, sand, and gravel within the area proposed for improvement. Suitable disposal areas have been designated by the U. S. Fish and Wildlife Service. The materials will be removed by hydraulic dredge and deposited in the above areas.

4. Unit Price. - Unit prices are based on recent experiences in dredging in comparable harbors in the locality. Similarly, unit prices for jetty construction are based on recent prices in such construction with consideration being given to the availability of stone at nearby quarries. Estimates of navigational aids were furnished by the U. S. Coast Guard.

5. Maintenance. - The estimated additional maintenance quantities for dredging are based on past State dredging experiences with allowances made for additional anchorage areas. Jetty maintenance costs are comparable to maintenance costs in similar harbors.

6. Overdepth Side Slopes. - Estimated dredging quantities allow for a 1-foot tolerance in overdepth, both in channels and basins. Dredging side slopes were estimated as 1 vertical on 3 horizontal. Jetty side slopes

5. Maintenance. - The estimated additional maintenance quantities for dredging are based on past State dredging experiences with allowances made for additional anchorage areas. Jetty maintenance costs are comparable to maintenance costs in similar harbors.

### PROJECT COST ESTIMATES

<u>Cost Account Number</u>		<u>Cost Estimate April 1966</u>
09	<u>Channels</u> 6-foot deep channel, 60 feet wide (100 feet at entrance) mouth to vicinity of Nabbys Pt. 190,000 c. y. of mud, sand & gravel @ \$1.25	\$238,000
	5.5-acre anchorage (vici- nity of Jordan Point) 70,000 c. y. of mud, sand and gravel @ \$1.25	88,000
	7.1-acre anchorage (Neck Cove) 100,000 c. y. of mud, sand and gravel @ \$1.25	125,000
		\$ 451,000
10	<u>Jetties</u> Jetty, south side of entrance. Top width 6.5 feet, 1400 feet long. Top elevation 11.5 feet, 1:2 slopes 27,000 tons of stone @ \$8.00	216,000



PROJECT COST ESTIMATES (Cont'd)

<u>Cost Account Number</u>			<u>Cost Estimate April 1966</u>
	Brought Forward	216,000	
	Jetty, north side of entrance 1200' long. Top elevation /10.0 45,000 tons of stone @ \$8.00	360,000	<u>576,000</u>
			\$1,027,000
	Contingencies		<u>153,000</u>
			\$1,180,000
30	Engineering & Design Supervision & Adminis- tration	55,000 <u>95,000</u>	<u>150,000</u>
			\$1,330,000
	Aids to Navigation (U.S. Coast Guard)		<u>27,000</u>
	Total Project Cost		\$1,357,000*

\*Excludes \$16,000 study costs.

ESTIMATES OF ANNUAL CHARGES

Federal Investment

a. Corps of Engineers

(79% of \$1,330,000 = \$1,051,000)

Interest and Amortization

1,051,000 x 0.03979      \$41,800

Additional Annual Maintenance      19,200

\$    61,000

ESTIMATES OF ANNUAL CHARGES (Cont'd)

Brought Forward		\$ 61,000
b. <u>United States Coast Guard</u>		
\$27,000		
Interest and Amortization	\$1,100	
Maintenance	<u>1,400</u>	
		2,500
Total Federal Annual Charges		<u>\$ 63,500</u>
Non-Federal Annual Charges		
Investment (1,300,000 x 0.21 = \$273,000)		
Interest and Amortization		
\$279,000 x 0.03979		<u>11,100</u>
Total Annual Charges		\$ 74,600

7. Estimates of Alternative Projects. Approximate cost estimates were made of an alternative project whereby the channel would be extended about 1,000 feet further upriver to the Town Dock. However, this reach of the channel runs through an area of ledge rock that would, to effect a 6-foot channel project depth, require the dredging of 3 feet of rock, with a total volume of 7,000 cubic yards, or a cost of \$350,000 for rock removal. The total cost of this upper reach of the channel is estimated at \$375,000 with annual charges of \$14,000. The additional annual benefits anticipated to result from extending the channel are not estimated at more than \$1,000 to \$2,000. As this alternative was so obviously unjustified, the estimates were not refined beyond this degree.

8. Some consideration was also given to an alternative project with a channel depth less than 6 feet. However, it was determined that the limitation of a minimum channel depth of 6 feet because of operating characteristics of the usual dredging equipment, as described in Engineer Regulation 1165-2-14, paragraph 8, pertained in this case, and any lesser channel depth was rejected.

APPENDIX B

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
59 Temple Place  
Boston, Massachusetts 02111

December 17, 1964

Division Engineer  
New England Division  
U. S. Army Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Sir:

This constitutes our conservation and development report on your study of navigation improvements for Ipswich River, Essex County, Massachusetts, which you are making under authority of Resolution of House of Representatives, Public Works Committee, adopted August 14, 1959. Our report was prepared under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-666 inc.), in cooperation with the Massachusetts Division of Marine Fisheries and Division of Fisheries and Game. These agencies concurred in the report as indicated by letters dated December 11, 1964 and November 18, 1964, respectively.

We understand that the project will provide a navigation channel six feet deep at mean low water, 50 feet wide and about three miles long, extending from Little Neck Inlet upstream to the first highway bridge at the Village of Ipswich. In addition, local interests have requested dredging an access channel in Neck Creek and a marina area at the upper end of Neck Creek, both to 6 feet deep at mean low water. The marina area has been designated only in a general way. The amount of material to be dredged and areas of spoil disposal have not been determined as yet.

There are soft clams in the project area. Ipswich River from the town to its opening at Little Neck into Plum Island Sound is highly polluted, and harvesting clams there is prohibited. Clams are harvested from Neck Creek, Fox Creek, and Treadwell Island Creek, and although these areas are moderately polluted, clams taken can be cleansed and then marketed. Striped bass, Atlantic tom cod, American smelt, and other sport fish are caught in the project area.

The creeks and marshes in the area are important to waterfowl. In addition, they serve valuable functions as nursery and feeding grounds for various estuarine animals and play an important role in estuarine nutrient cycles.

Dredging of the main stem channel will not cause significant damage to fish and wildlife resources. Dredging the access channel and the associated marina area in Neck Crane will inflict minor damages to shellfish resources. Indiscriminate disposal of spoil resulting from dredging, however, could cause significant damage to fish and wildlife resources. No spoil should be placed on adjacent marshland nor in adjoining shallow waters of the project area since these areas produce a continuous supply of food and nutrient material which is considered basic to the food chain for waterfowl, finfish and shellfish species throughout the estuary. To minimize damages to fish and wildlife, spoil should be deposited on an approved dumping ground at sea. If spoiling in the immediate project vicinity is necessary, the least damage to fish and wildlife resources would occur if spoil were confined to as narrow a band as possible, behind suitable diking, along Jeffries Neck and Little Neck Roads as depicted on plate I.

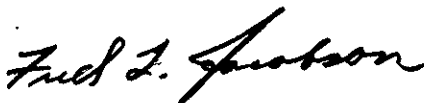
The project will result in minor benefits to the sport fishery through the utilization of the channels and the marina by boat fishermen. We cannot foresee any significant increase in lobstering and clamming activity as a result of the proposed improvements.

We recommend--

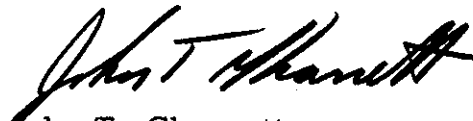
1. That all spoil resulting from the project be disposed of at sea on an approved dumping ground.
2. That if spoiling in the immediate project vicinity is necessary, it should be confined to a narrow band behind suitable diking along Jeffries Neck and Little Neck Roads as depicted on plate I.
3. No other areas should be selected for spoil disposal without prior approval by the Massachusetts Division of Marine Fisheries, the Division of Fisheries and Game and this Service.

We plan no further studies of this project unless your plans change or if spoil sites, other than those we recommend, are selected.

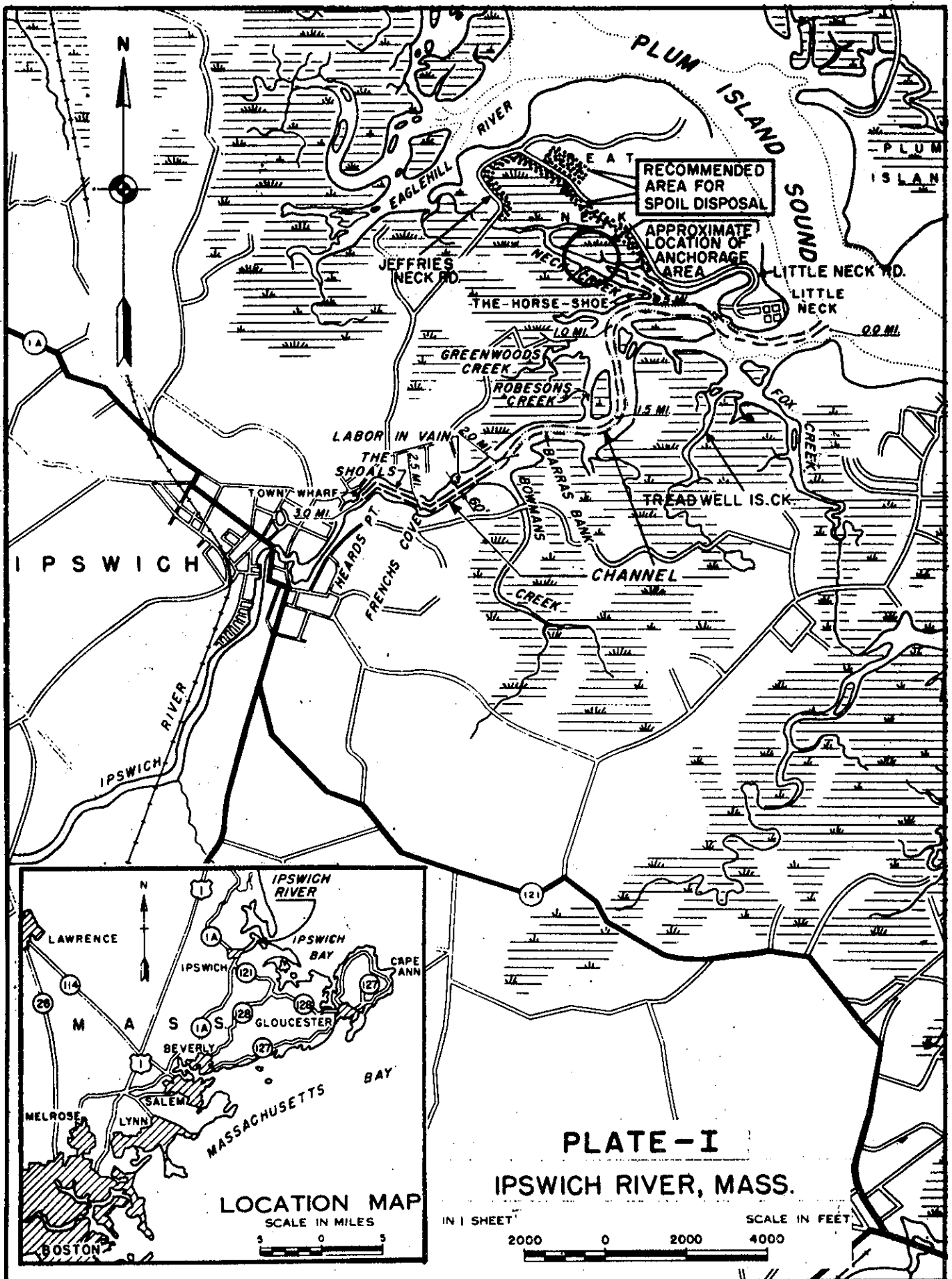
Sincerely yours,



Fred L. Jacobson  
Acting Regional Director  
Bureau of Sport Fisheries & Wildlife



John T. Gharrett  
Regional Director  
Bureau of Commercial Fisheries



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
U.S. POST OFFICE AND COURTHOUSE  
BOSTON, MASSACHUSETTS 02109

January 21, 1966

Division Engineer  
U. S. Army Corps of Engineers  
New England Division  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Sir:

This is a supplement to our December 17, 1964, conservation and development report on your study of navigation improvements for Ipswich River, Essex County, Massachusetts, which you are making under authority of a Resolution of the Public Works Committee of the House of Representatives adopted August 14, 1959. Our report was prepared under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-666 inc.), in cooperation with the Massachusetts Division of Fisheries and Game and Division of Marine Fisheries. This report has the concurrence of these agencies as indicated by letters dated January 10, 1966.

Mr. Leslie in his letter of November 2, 1965, requests our comments on an alternate spoil area being considered in Neck Cove. This spoil area was outlined on the map attached to Mr. Leslie's letter and will consist of a dike 10 feet or more in height to be placed inside the cove. The area behind the dike will contain all the spoil material from channel and anchorage dredging.

Spoiling in Neck Cove will destroy a small intertidal flat on which some softshell clams are produced. Since Neck Cove is located at the mouth of the productive Ipswich River marshes, spoiling here will be the least destructive of any similar site that might be selected in this area. We, therefore, do not object to the use of Neck Cove for spoil disposal provided that the spoil is deposited well within the cove and is suitably contained.

We plan no further studies unless specific features of the plan of improvement are changed. If any changes occur please advise us so that we can determine whether additional fish and wildlife studies are needed.

Sincerely yours,

*Richard E. Griffith*

Regional Director  
Bureau of Sport Fisheries and Wildlife

*Donald J. Aske*

Actg. Regional Director  
Bureau of Commercial Fisheries



APPENDIX D



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

Northeast Region  
John F. Kennedy Federal Building  
Boston, Massachusetts 02203

March 24, 1967

Mr. John William Leslie ✓  
Chief, Engineering Division  
U. S. Army Engineer Div., New England  
Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Mr. Leslie:

Reference is made to your letter of 27 February 1967 concerning the study for navigation improvements of the Ipswich River, Massachusetts, which proposes that an estimated 360,000 cubic yards of dredged material be spoiled off shore where water depths exceed 60 feet.

Much of the indicated dumping area lies within the three-mile limit and, therefore, is in waters which are being classified under Section 10 of the Federal Water Pollution Control Act. Under the terms of this Act, water quality standards which protect the public health or welfare and which enhance the quality of water are to be established by the Commonwealth of Massachusetts and approved by the Secretary of the Interior. This work is now in progress and will be completed this year.

It is understood that actual construction of the project is contingent upon further Congressional appropriation and authorization; and will, therefore, take place after the establishment of water quality standards. With the understanding that actual disposal methods will comply with such water quality standards as are then in force, this office has no objection to the proposed offshore disposal area.

Sincerely yours,

*Walter M. Klashman for*

Lester M. Klashman  
Regional Director  
Federal Water Pollution  
Control Administration

cc: Richard Griffith,  
Regional Director  
Bureau of Sport Fisheries



PUBLIC HEALTH SERVICE

APPENDIX D  
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
REGIONAL OFFICE  
Region I  
John Fitzgerald Kennedy Federal Building  
Boston, Massachusetts 02203

March 14, 1967

Mr. John W. Leslie, Chief  
Engineering Division  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Mr. Leslie:

Reference is made to your letter of February 27, 1967, requesting review and approval of the proposed offshore dumping of dredged material from the Ipswich River Project. It is noted that this dredging project will provide a six feet deep channel, approximately 60 feet in width from the mouth of the Ipswich River to Heards Point, about 2½ miles upstream. It is also noted that the U. S. Fish and Wildlife Service has submitted data to show why the dredged material, estimated at 360,000 cubic yards, should not be disposed of on the marshes in the vicinity of the project.

We have checked with the Division of Commercial Fisheries, Massachusetts Department of Natural Resources, and have been informed that the selected area for dumping the dredged material would not adversely affect any commercial fish or shellfish operations. Therefore, we offer no objection to the proposed method of disposal which provides for dumping in a designated area in the ocean, off the mouth of the Ipswich River where the minimum depth is 60 feet.

Information is not available as to the type of material to be dredged, that is, whether it will be primarily mud, sand, or gravel. It would appear that, depending on the type of material, possible use could be found for disposing of this dredged material on land in the area. For example, it might be found that some of the material would be suitable for road construction in the area.

Sincerely yours,

Frank Tetzlaff  
Associate Regional Health Director  
Environmental Health Services  
Public Health Service

IPSWICH RIVER, MASSACHUSETTS  
Information Required by Senate Resolution 148  
85th Congress, Adopted 28 January 1958

1. Navigation Problems. Ipswich River is a small stream in northeastern Massachusetts with a drainage area of 97 square miles. Its lower 3 miles is tidal and subject to shallow draft navigation by both commercial fishing and recreational boating. The navigable portion of the waterway has been improved at several times, both by the Federal Government and by the Commonwealth of Massachusetts. Federal improvement, first accomplished in 1886, consisted of deepening 3 shoals located in the upper portion of the navigable section. State improvement consisted of provision of a 6-foot deep channel for about 2.5 miles and a breakwater at the entrance.

2. The navigational problems encountered in the river are those attributable to inadequate depths, particularly at low tide, limited anchorage space, and recurrent formation of a sand bar at the mouth of the river in Plum Island Sound. At the present time the river has shoaled in several locations to the point where navigation is possible only at high tidal stages. At the entrance, shoaling occurs soon after maintenance. This condition is caused by the predominant northerly littoral drift of materials in Plum Island Sound. Anchorage space in the river is limited, and boats either anchor in the channel or along the banks, where they go aground at low water.

3. Improvement Considered. Local interests requested a 6-foot deep channel from the mouth to the vicinity of Town Wharf for a distance of about 3 miles. The same interests requested anchorage in the vicinity of the Town Wharf and in Neck Creek. Jetty and groin construction at the river mouth was requested also.

4. Improvement Recommended. The plan of improvement is essentially the same as requested by local interests. It differs only in anchorage locations, and channel length. It was found that the upper half-mile of the river, from the vicinity of Nabbys Point to the Town Wharf contained hard bottom materials, such as ledge rock and boulders. Costs for removal of these materials would be of sufficient magnitude to exceed the benefits to be realized by deepening this section. On this basis, it was decided to terminate the channel at a line 400 feet downstream of Nabbys Point (Mile 2.5). An anchorage area 5.5 acres in

size and 6 feet deep near the upstream end of the 6-foot channel was included in the plan of improvement. In the lower section it was found more economical to provide 7.1 acres of anchorage in Neck Cove, in lieu of Neck Creek as desired by local interests. This anchorage area would be more accessible as well as more desirable. The recommended improvements consist of the following:

- a. A channel, 6 feet deep and 60 feet wide, with extra widening at the bends, and a width of 100 feet through the entrance, the channel to extend from the 6-foot depth contour in Plum Island Sound to a line 400 feet south of Nabbys Point.
- b. A 5.5-acre anchorage, 6 feet deep, adjacent to the upstream end of the 6-foot channel.
- c. A 7.1-acre anchorage in Neck Cove adjacent to the 6-foot channel.
- d. A 1200-foot long jetty to be located on the north side of the entrance, the jetty to have a top width of 6.5 feet at an elevation of 11.5 feet above mean low water, with side slopes of 1 vertical on 2 horizontal.
- e. A 1400-foot long jetty to be located on the south side of the entrance, the jetty to have a top width of 6.5 feet at an elevation of 11.5 feet above mean low water with side slopes of 1 vertical on 2 horizontal.

5. First Cost of Improvement. The estimated first cost of construction are based on prices for similar construction prevailing in April 1966. The costs are detailed as follows:

<u>Corps of Engineers</u>		
Channels	\$238, 000	
Anchorage	213, 000	
Jetties	<u>576, 000</u>	
		\$1, 027, 000
Contingencies		<u>153, 000</u>
		\$1, 180, 000
Engineering & Design	\$ 55, 000	
Supervision & Administration	<u>95, 000</u>	
		\$ 150, 000
Total Corps of Engineers Cost		\$1, 330, 000

Brought Forward \$1,330,000

U. S. Coast Guard

Additional Navigation Aids 27,000

Total Project Costs \$1,357,000

6. Annual Costs and Benefits. Annual charges are based on an anticipated 50-year project life and at interest rates of 3.125 per cent for both Federal and non-Federal interests. An allowance for average annual maintenance is included in annual charges.

7. Benefits are based on commercial fishing, both existing and prospective, and on existing and prospective recreational boating. Annual benefits are estimated to total \$151,300 of which \$119,550 are considered general and \$31,750 local. On this basis local interests should share in construction costs in proportion to the local benefits to be derived, computed as 21 percent local and 79 percent general.

a. Estimated Annual Charges

Corps of Engineers

	<u>Federal</u>	<u>Non-Federal</u>	<u>Total</u>
Interest and Amortization	\$41,800	\$11,100	\$51,900
Additional Annual Maintenance	<u>19,200</u>		<u>19,100</u>
Total	\$61,000	\$11,100	\$72,100

U. S. Coast Guard

Interest and Amortization	\$ 1,100	-	\$ 1,100
Annual Maintenance	<u>1,400</u>	-	<u>1,400</u>

Total	\$ 2,500		\$ 2,500
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Total Annual Charges \$74,600

b. Benefit-Cost Ratio. 2.0.

8. Apportionment of Cost and Local Cooperation. As the benefits to be realized are partly general and partly local in nature, local interests

should contribute in cash a proportionate share of the first cost of construction, presently estimated at \$279,000 (April 1966). The improvement is recommended subject to the requirements that local interests:

(a) Provide, without cost to the United States, all lands, easements, and rights-of-way necessary for construction and subsequent maintenance of the project and of aids to navigation;

(b) Hold and save the United States free from damages that may result from project construction or maintenance;

(c) Provide suitable areas determined by the Chief of Engineers to be required in the general interest for initial and subsequent disposal of spoil and necessary retaining dikes, bulkheads and embankments therefor or the cost of such retaining facilities;

(d) Provide a public landing in the vicinity of each anchorage area, open to all on equal terms, and provide necessary moorings in the anchorages.

9. Discussion. Local interests have been consulted and approved the recommended plan. They have indicated also that the requirements of local cooperation will be fulfilled. Proposed local cooperation is consistent with similar projects. The project is economically justifiable on the basis of data in the report and criteria for similar projects.